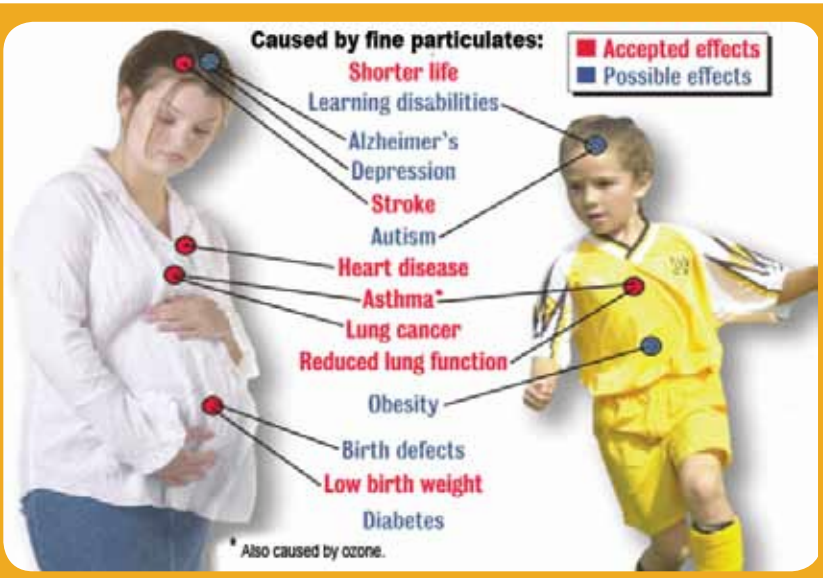
Wood Smoke in the Comox Valley

Breathe Clean Air Comox Valley

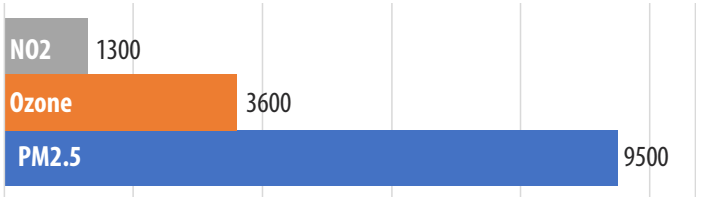


Thousands of studies show how fine particulates (PM2.5) harm people. Many effects are now accepted by the medical community and new research is highlighting many other likely effects.

To learn more visit "Doctors & Scientists Against Wood Smoke Pollution" at woodsmokepollution.org.

Estimate of Premature Deaths from Air Pollution in Canada

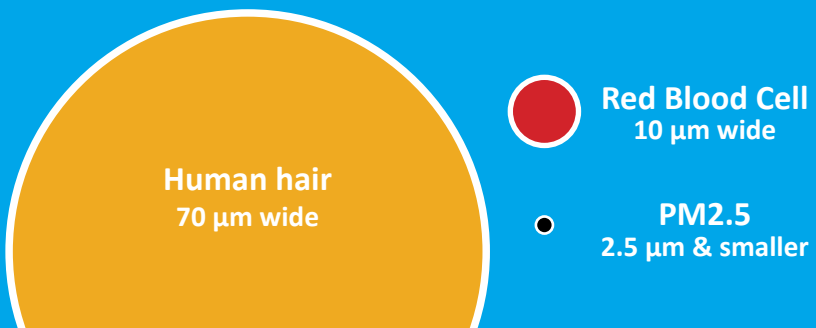
Health Canada estimates that 14,400 deaths per year in Canada can be attributed to human sources of these three air pollutants.



From: "Health Impacts of Air Pollution in Canada: An estimate of premature mortalities" by Health Canada, 2017.

What is PM2.5?

Particulate Matter (PM) that is 2.5 microns (µm) wide or smaller is called PM2.5. These fine particulates are inhaled deep into the lungs. They pass into the bloodstream and travel to all parts of the body, even the brain. Wood smoke is full of PM2.5.



Wood smoke and our health

All types of smoke are harmful to human health.

Cigarette and wood smoke are both full of fine particulates (often called PM2.5) and other toxins. The fine particulates get deep into our lungs and travel into our bloodstream.

Infants and children are among the most vulnerable to the harmful effects of fine particulates.

Their developing lungs are easily affected by wood smoke. The pollution can increase asthma rates and attacks and other respiratory issues like pneumonia and bronchitis.

Children's lifetime risk of lung cancer increases when they breathe wood smoke and their immune function can decrease.

Wood smoke pollution has also been linked to lower birthweights and pre-term deliveries.

For adults, wood smoke can cause inflammation, worsen heart and lung disease, and result in strokes. Even short-term exposure can trigger heart attacks.

Studies indicate that particulate pollution is also a risk factor in the development and progression of brain diseases like Alzheimer's and Parkinson's. It has also been linked to worsened brain function.

No one is immune. Just like with cigarette smoke, people who breathe in wood smoke might not get sick. But everyone's *risk* of negative health effects increases when they breathe in any kind of smoke.

"There is no safe level of exposure to air pollution," according to Dr. Enns, Medical Health Officer with Island Health.

"Particulate matter [PM] is considered the air pollutant of greatest concern to human health in B.C.

Research has shown that exposure to PM can lead to increased days lost from work or school, emergency room visits, hospital stays, and deaths."

BC Healthlink

Monitoring highlights role of wood heat

Two mobile monitoring studies have measured PM2.5 pollution in different areas of the Comox Valley.

The studies indicate that wood heat is the greatest source of pollution for many people.

The worst wood smoke pollution was mostly recorded in older residential neighbourhoods. But even one home can create a lot of pollution for neighbours.

Winter PM2.5 readings at the permanent government monitor in Courtenay also show a clear "wood stove signature" as the readings go up every evening and down during the day.

The first mobile study was done in 2008-09 by University of Victoria researchers *(sample map on left)*. The second was done in 2017 by a University of BC researcher *(sample map on right)*. View all of the maps from both studies, and learn more about what they mean at www.breathecleanair.ca/problem/maps.

How bad is Comox Valley air?

A BC government air monitoring station at Courtenay Elementary School measures PM2.5. It shows readings for each hour and each 24-hour period.

The readings show just how polluted our air gets.

Every winter, we frequently fail to meet BC's Air Quality Objective for a 24-hour average. Sometimes an air quality advisory is issued for the bad days, but not always.

Of 13 communities monitored on Vancouver Island and the Sunshine Coast, Courtenay has the worst air quality. Our winter PM2.5 levels are also *far* higher than in Vancouver.

In fact, Courtenay has some of the worst levels of particulate matter in the whole province according to multiple State of the Air reports by the BC Lung Association.

To view readings at Courtenay's monitor: www.env.gov.bc.ca/epd/bcairquality/readings/map/station.html#E285829

Personal stories about the impact of wood smoke

"There are hundreds of us in this beautiful valley who are having to use very expensive drugs every day because of all the wood smoke in the air."

"I think about the development of my children's lungs and their increased risk of lung and heart disease."

"I have serious lung issues and feel like a prisoner in my own home with air cleaners running 24/7."

"After about four years of living here I started getting asthma, and each year it got worse. I have had pneumonia numerous times...I'd never been troubled with it prior to moving here."

"My neighbour is cutting off all his branches and burning them right away. The whole neighbourhood is full of toxic smoke....and it is coming directly into our house even with the windows closed. Have talked to him, but it just makes him burn all the more."

"I've had to rewash clothes I left in the dryer overnight because they smelled like wood smoke the next day."

More at: www.breathecleanair.ca/problem/personal-stories.

Exposure to wood smoke

The closer wood burning happens to where people live, work and go to school, the greater the risk of exposure to smoke.

Home heating with wood and yard waste burning happen right where people live (and home heating occurs daily for many months). The risk of exposure is high.

Slash burning produces a lot of fine particulates in the Comox Valley, but usually far from where people live.

Other types of open burning often happen much closer to communities, which can create a greater risk of exposure than slash burning.

Residential wood heating

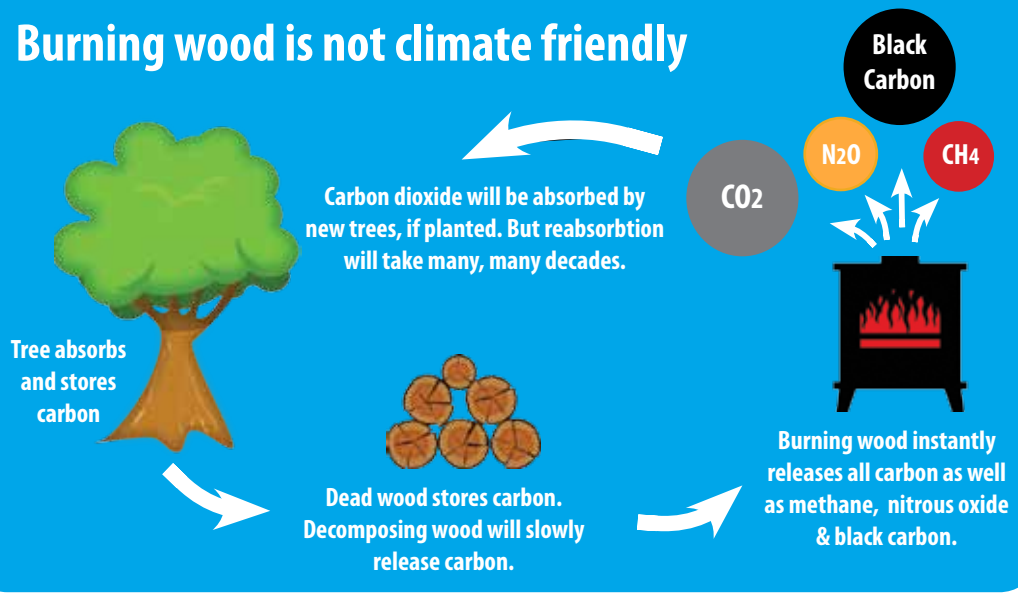
Backyard Burning

Land clearing & agricultural burning

Forestry slash burning

Greatest risk — RISK OF EXPOSURE — Lowest risk

Burning wood is not climate friendly



Is wood heat the best environmental choice?

In the past, wood heat was pitched as a climate change-friendly heating fuel. Today, research indicates this is not true.

Greenhouse gas emissions

Compared to natural gas, wood puts out 2 times more CO_2, 60 times more methane and 400 times more Nitrous Oxide (N_2O) for each unit of energy burned. It also puts out more CO_2 and N_2O than the burning of oil or even coal.[1]

Some argue new trees will at least reabsorb the CO_2. However, it takes *many* decades for new trees to grow enough to absorb the amount of CO_2 released during burning. We need to reduce the carbon we put into the atmosphere much quicker than that.

When a tree decomposes naturally, the carbon stored in the wood is released slowly and valuable nutrients are left behind to help new growth.

Black Carbon

Canadian government inventories show that wood heating is one of the biggest sources of Black Carbon. In 2016, wood heating released 33% of all of Black Carbon emissions in the country.[2]

Black Carbon is a short-lived, small, airborne particle strongly linked to climate warming and health effects.

1 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chap. 2, Table 2.5.
2 Canada's Black Carbon Inventory 2018 Edition.

Chemicals found in both wood and cigarette smoke

Benzopyrene
One of the most potent cancer-causing chemicals known.

Benzene
Causes Leukemia and other cancers.

Formaldehyde
Used to preserve dead bodies. Causes cancer. Banned in many countries.

Toluene
Is an industrial solvent. Affects the brain and nervous system

Arsenic
A toxic metal used in insecticides and as a wood preservative.

Anthracene
Used to make dyes, plastics and pesticides.

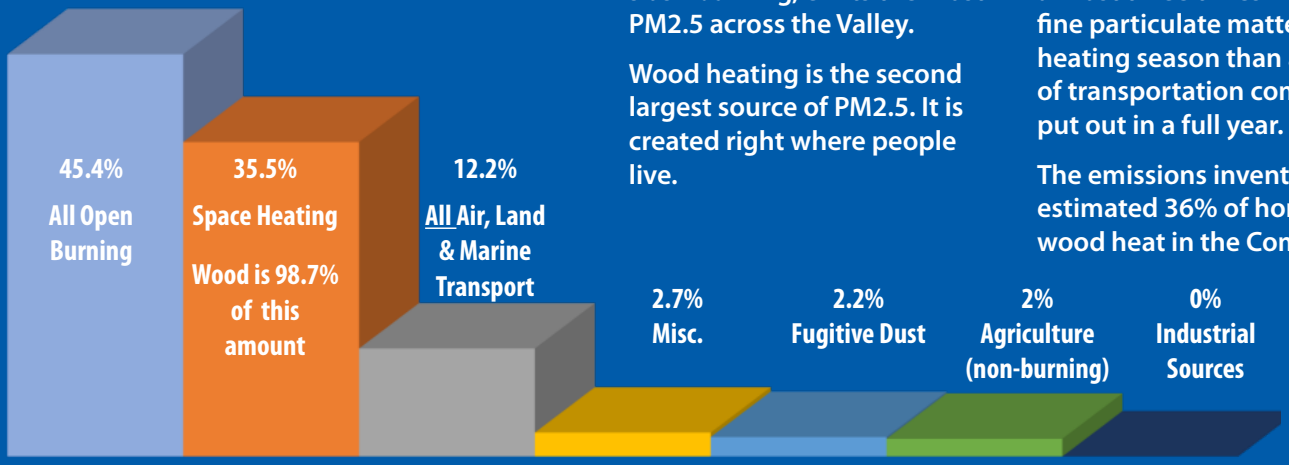
Acrolein
Can affect the eyes, nose, throat and lungs. May contribute to heart disease.

See: http://burningissues.org/pdfs/WoodSmokeTobaccoSmtablemira.pdf

"In an age where most parents know better than to smoke cigarettes around their children, why are they still burning wood?"

BC Lung Association

Sources of PM2.5 in the Comox Valley



Open burning, such as forestry slash burning, emits the most PM2.5 across the Valley.

Wood heating is the second largest source of PM2.5. It is created right where people live.

Wood heating puts out almost three times more fine particulate matter in the heating season than all forms of transportation combined put out in a full year.

The emissions inventory estimated 36% of homes use wood heat in the Comox Valley.

Data from: Particulate Matter Emissions Inventory for the Comox Valley 2015 Base Year by RWDI AIR Inc.

How we can clean up our air

Government action

Governments need to use a combination of education, incentives and regulation.

Educate about health impacts. Increased awareness of the health risks of wood smoke increases motivation and support for change, at both the household and community level.

Transition people to non-wood heat. A lot of money has been spent on getting people to use newer wood stoves. But new stoves do not guarantee reduced emissions or prevent people from burning wet wood or other illegal materials. A perfectly run stove will still emit far more toxins and fine particulates than any other source heat.

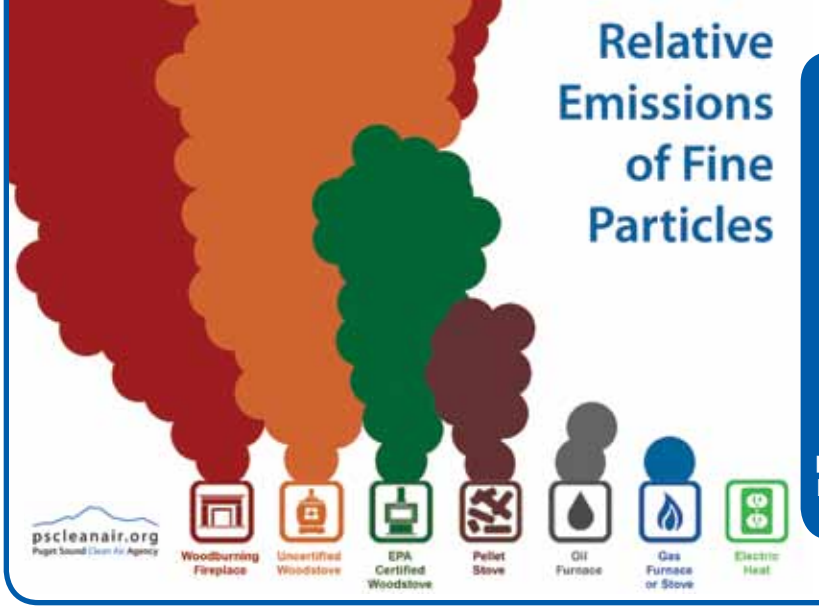
People need to switch to non-solid fuel sources of heat to guarantee a significant reduction in pollution, especially in densely populated areas. Cleaner heat sources will save public money because they do not require ongoing education on proper use or enforcement if misused. Cleaner heat also saves on health care costs.

Ensure good incentive programs and affordable energy. Except for baseboard heating, most other sources of heat cost about the same to operate as wood heat (for people buying their wood).[1] The cost of changing over to new, non-solid fuel appliances, however, is a known barrier for many.

We need good incentive or loan programs to help people switch. We also need to ensure electricity, our cleanest energy source, is affordable. And we need programs to help people better insulate their homes to reduce heating costs.

Develop regulatory tools. We need bylaws that define legal fuels and appliances and establish timelines for changes; stop the installation of new stoves; decommission old stoves; institute no burn days when air quality is poor; protect neighbours and the public from smoke; and have meaningful enforcement tools. The focus should be on densely populated areas.

End yard waste and open burning. Dropping off yard waste at landfills should be free, and composting and chipping should be promoted.



Certified stoves *(dark green)* emit far more pollution than non-wood appliances, even when best burning practices are followed.

And there is no guarantee people will use best practices.

Individual action

Use clean heat. If you heat with wood, switch to cleaner options for the health of your family and neighbours. Look for rebates to help you switch at comoxvalleyrd.ca/wood stove.

Stop outdoor burning. If you burn wood or yard waste outside you are affecting people around you.

Help raise awareness. Talk to friends and family about the health risks of wood smoke pollution. Share our resources.

Contact elected officials. Call for immediate action to clean up our air and protect our health. Email addresses can be found at breathecleanair.ca/resources.

1 See: breathecleanair/solutions for information comparing costs of heating fuels and other resources.

The cost of wood heating

Many consider wood heating a way to save money. But what are the costs we don't think of? What are others paying as a result?

View our short film to learn more: breathecleanair.ca/resources

Reducing smoke saves lives

A successful wood smoke reduction program in Launceston, Australia saved lives.

It reduced deaths from respiratory disease by 28% and cardiovascular disease deaths by 20%.

The program focused on explaining the health effects of wood smoke pollution and replacing wood stoves with non-wood heating appliances.

Other programs that focused on teaching people how to operate their stoves or upgrade to new ones were not very effective.

See "What makes a successful wood smoke reduction program" by Dr. D.L. Robinson at: breathecleanair.ca/resources.

Breathe
Clean Air Comox Valley

Our vision:

- All residents are able to breathe clean air, in the valley and in our neighbourhoods.
- The Comox Valley will be celebrated for having the cleanest air on Vancouver Island.

Connect: info@breathecleanair.ca
Learn more: www.breathecleanair.ca
Facebook: "Breathe Clean Air Comox Valley"

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